

ON THE IDENTITY OF *CHLORONIA BOGATANA* WEELE
(NEUROPTERIDA: MEGALOPTERA: CORYDALIDAE)

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Abstract.—Recently collected material from Ecuador, Peru and Bolivia has been compared with the Colombian holotype. This is all considered to be one species, despite some variation in marking of the head and thorax. The species is redescribed and the male genitalia are figured on the basis of these examples.

Key Words: dobsonfly, South America, systematics

In our revision (Penny and Flint 1982) of the Neotropical genus *Chloronia*, the one described species which we were not able to treat adequately was *C. bogotana* Weele. At the time I had seen several females from Bolivia that were nearly identical in appearance of the wings, but were different in marking of the head and thorax. Considering these differences, the lack of males from Bolivia, and the great distance between the two collection sites I was unwilling to consider them conspecific. In the intervening years I have obtained males from Bolivia and Peru (in the collection of the National Museum of Natural History [NMNH], Washington, D.C., USA) and studied another specimen from Ecuador. The unique holotype of *bogatana* has again been borrowed and compared with this newly accumulated material, with the result that now I am willing to consider this all one species, but with considerable variation, as discussed below.

I dedicate this paper to the late Dr. Donald R. Whitehead, of the Systematic Entomology Laboratory, Agricultural Research Service, United States Department of Agriculture. Don was an individual of broad interests in the biological and systematic

world of the insects. To the best of my knowledge he never worked directly with the Megaloptera, but he did have an interest in aquatic insects. Some of the first lots of Trichoptera I received after my arrival at the National Museum in the early 1960's were larvae of Trichoptera that Don had collected in New Jersey, which also was my first contact with him. His early, untimely death is a great loss not only personally but also to Entomology.

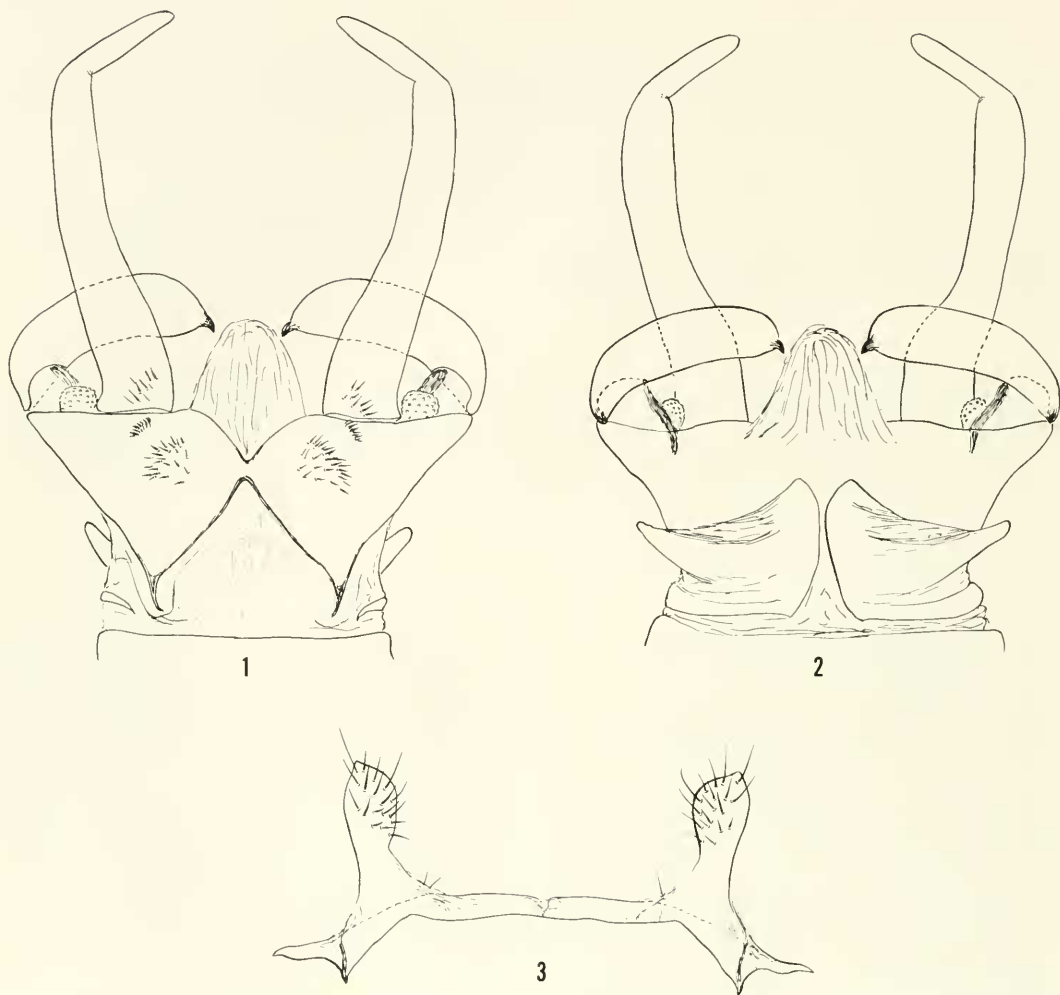
Chloronia bogotana Weele

Figs. 1-10

Chloronia bogotana Weele, 1909: 253; 1910: 33.—Penny & Flint, 1982: 8.

The following new description and diagnosis is based on the new material from Bolivia and Peru (Fig. 10); the type was re-described in the 1982 publication.

This appears to be the sister species to *C. gloriosoi* Penny & Flint, known from northern Panama and central Costa Rica. In appearance it differs quite strongly from *gloriosoi* in having the infuscations in the membrane of the forewings broader, but more diffuse and paler. The marking on the head is more extensive in *bogatana* with an

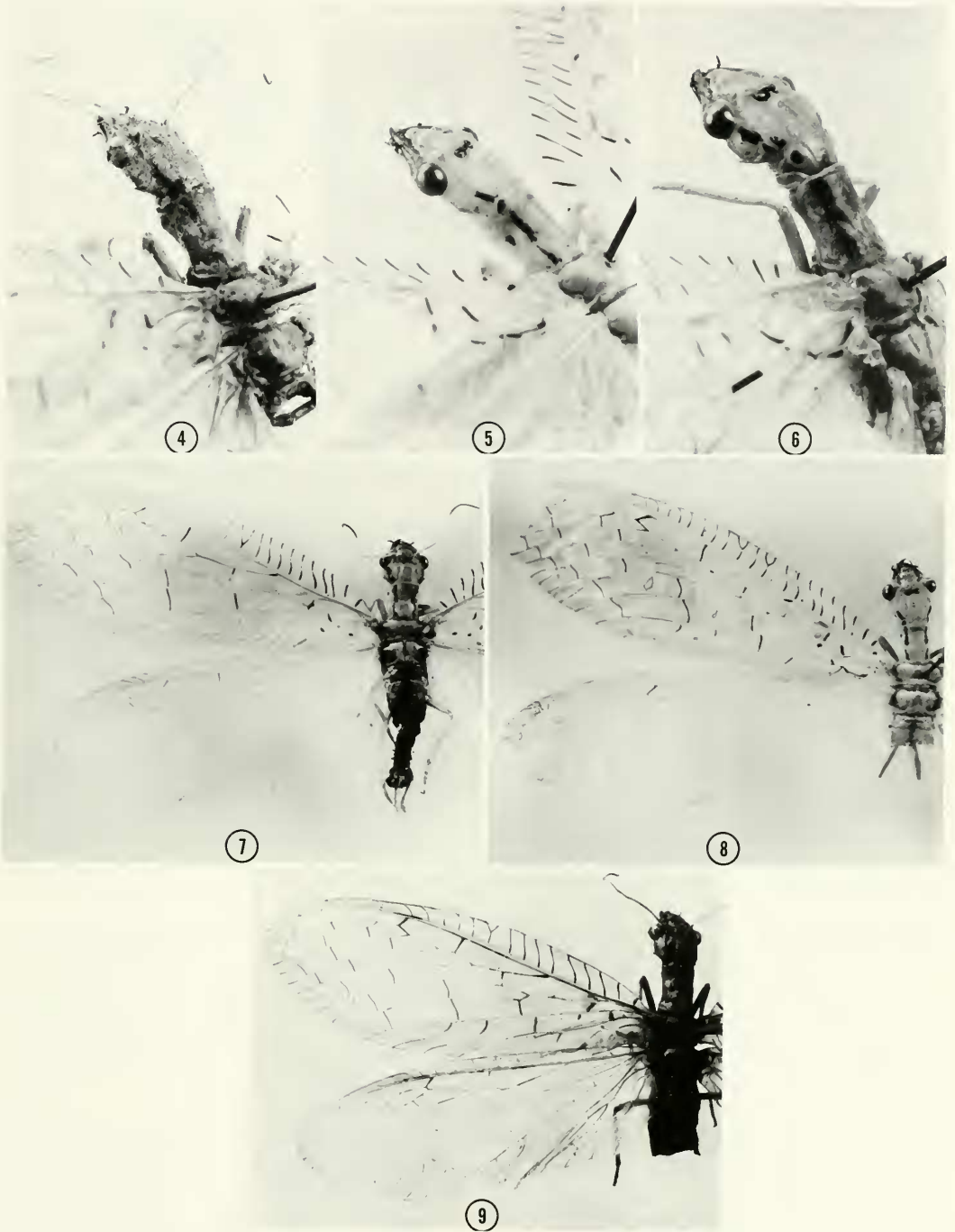


Figs. 1-3. *Chloronia bogotana* Weele, male genitalia. 1, dorsal. 2, ventral. 3, tenth gonostyli and gonocoxites, ventral.

elongate mark extending posteriad of the eye to nearly the level of lateral spine, posteriad to which are two more lineate marks, one above and the other below the lateral carina (the ventralmost of these marks may be connected to the anterolateral mark), and finally with the dark spot on the posterior part of the head which is usually inserted under the pronotum. In contrast, *gloriosoi* only bears a lineate mark posteriad above the lateral carina which is continuous with the postermost spot under the pronotum. In addition the latter species bears 4 dark spots along the anterior margin of the meso-

notum which are lacking in *bogotana*. The male genitalia of the two species are similar. The most distinctive differences are in the ninth gonostyli in *gloriosoi* which are distinctly enlarged toward their bases and the ninth sternites which have a larger postero-mesal lobe.

Adult.—Length of forewing, ♂ 32–44 mm (ave. 4 ♂, 40.2 mm), ♀ 38–42 mm (ave. 4 ♀, 40.0 mm). Color generally pale yellow with fuscous spots. Head pale yellow with fuscous ocellar triangle, compound eyes, labial and maxillary palpi, mandibles becoming browner distally; a linear fuscous mark pos-



Figs. 4-9. *Chloronia bogotana* Weele, head, pronotum and wings. 4, head and pronotum of holotype, dor-solateral. 5, same of example from Zamora, Ecuador. 6, same of example from Yungas La Paz, Bolivia. 7, wings of Bolivian example. 8, same of Ecuadorian example. 9, same of holotype.

teriad to eye, two smaller linear spots posterior of lateral spine, one above and other below lateral carina, a spot near anterior margin of posterior part which is usually covered by pronotum. Antenna with basal 20–25 segments pale yellow, apical 15–20 segments fuscous. Pronotum pale yellow, the 2 anterior and 2 posterior, linear, fuscous spots nearly meeting in middle; mesonotum without fuscous spots. Forewing pale yellow with costal crossveins wholly or at ends fuscous out to near midlength of wing, all crossveins fuscous; basal dark spots reduced to those of crossveins and a single cellular spot, marking in membrane of cells faint, diffuse, but comparatively broad. Hindwing wholly pale yellow except for 2nd *r*, and often apical crossveins and veinlets fuscous. Male genitalia: Ninth tergum almost completely divided by a deep, V-shaped, excision; each tergite with 2 patches of short, spinous setae. Ninth sternite produced into a posterolateral lobe and smaller posteromesal lobe (posterior margin very broad and usually turned ventrad, then appearing as in Fig. 2; if the sternite is rotated so as to twist the posterior face inward, then the posteromesal lobe virtually disappears and the sternite appears as in Weele 1910: fig. 28). Tenth tergite long, slightly curved, with a diffuse, basal patch of enlarged, spinous setae. Ninth gonostylus incurved, of uniform diameter throughout, with a sharp apical point. Tenth gonostyli long (5–6 times as long as broad), clavate, hairy apicomeresally, connected by a bandlike gonocoxite.

Material examined.—COLUMBIA [Dept. Cundinamarca], Bogota, ♂ holotype (RNH). ECUADOR, Zamora-Chinchipe Prov., 8 km NW Zamora, mouth Rio Sabanilla, 1420 m, 1 Nov 1987, J. Rawlins, et al., 1 probable ♀ (CMNH). PERU [Dept. Huanuco], Tingo Maria, 670 m, Dec 1946, Weyrauch, 1 ♀ (NMNH); Huallaga River, 50 mi around Tingo Maria, 500–650 m, 25 Feb–15 Apr 1964, L. Gómez, 1 ♂ (RNH). Dept. Cuzco, Prov. Paucartambo, Puente San Pedro, ca. 50 km NW Pilcopata, 13°09'S:71°26'W,

1430 m, 2–3 Sep 1988, O.S. Flint, Jr. & N.E. Adams, 1 ♂ (NMNH); same, except 30–31 Aug 1989, N.E. Adams et al., 1 ♂ (NMNH). BOLIVIA [Dept. La Paz], Yungas La Paz, Río Mururrata to Suapi, 1400–1600 m, 26–28 Nov 1984, L. E. Peña G., 1 ♂ (NMNH); [Dept. la Paz], Rio Zongo, 750 m, Fasl [sic: Fassl] Coll., 2 ♀ [third now lacking abdomen] (MCZ).

Variation.—The holotype, which lacks its abdomen now (J. van Tol, pers. com.) and in 1982, is rather discolored with the head and thorax having for the most part the cuticle separated from the underlying tissue, thus rendering the coloration difficult to discern. The head now has a black line along the posterolateral carina connected to a black spot just in front of the under-pronotum section (Fig. 4). There are two pairs of spots laterally on the pronotum, and some intermediate darkening, but whether this represents four lineate marks or four spots with discoloration can not be said. The anterior margin of the mesonotum has four darkened spots, likely four pigment spots and not just discoloration. The wing coloration seems like that of the southern material (Fig. 9). The genitalia of the type, clearly a male in the photograph (Weele 1910: pl. II, fig. 10) and the figures (loc. cit., figs. 27, 28), pass very well for the illustrations here presented except for the ninth sternites. However, if the abdomen is still intact and uncleared, as in the male example from Bolivia, the ninth sternites have almost the exact form shown by Weele's fig. 28; when cleared and relaxed they "puff-up" and attempts to flatten them cause distortion and a frequent shape as shown in Fig. 2.

The specimen from Ecuador, taken near the eastern foot of the Andes close to the Peruvian border, offers another set of variations. There is a single linear black mark posterolaterally on the head (Fig. 5). This is narrowly separated from a black spot along the anterior margin of the under-pronotum section. Like the other southern examples there are 4 linear black marks on the pro-



Fig. 10. Distribution of *Chloronia bogotana* Weele.

notum and no mesonotal spots. The coloration of the forewings is basically the same as in the others, but the infuscations are a bit more intense and some of the basal radial cells are nearly filled with this infuscation (Fig. 8). Unfortunately this specimen lost its abdomen in shipment, as did two others in the same lot, but all three loose abdomens were female.

All the examples from Peru, including those from the northern Tingo Maria region, and Bolivia are in agreement with one another in terms of marking of the head, thorax and wings—as described above (Figs. 6, 7). The male from Tingo Maria is badly discolored, but the apparent head and thoracic colors are in agreement. The wings are rather gray, having lost the usual yellow color, and thus their pattern is totally lost. Unfortunately the genitalia have been cleared to transparency and the sclerites are falling apart, with the ninth sternites missing. What can be made out appears to be in general agreement with the other males.

Lacking fresh, well colored material, including males, from Colombia and Ecuador it is difficult to assess the significance of these

variations. Considering the apparent agreement between the original figures of the male genitalia of the Colombian type and the new material, my feeling is that this is one species varying somewhat in head and possibly mesonotal marking over its extensive range in the Andes.

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